WHAT IS CLAIMED IS:

1. An optical network system comprising a first optical network and a second optical network, each network comprising at least one optical gateway node and a plurality of passive optical add/drop nodes, the system comprising:

a first gateway node coupled to the first optical network and operable to:

forward a first copy of a received optical signal to a multiplexer/demultiplexer unit of the first gateway node, the multiplexer/demultiplexer unit operable to multiplex the first copy into one or more constituent wavelengths and to selectively forward or terminate the traffic in each wavelength of the first copy;

forward a second copy of the received optical signal to a regeneration element of the first gateway node, the second copy thus bypassing the multiplexer/demultiplexer unit;

selectively forward or terminate the traffic in each wavelength of the first copy at the multiplexer/demultiplexer unit; and

selectively perform one of the following on the traffic in each wavelength of the second copy at the regeneration element: terminate the traffic, forward the traffic to the second optical network, or forward the traffic on the first optical network after regenerating the traffic; and

a second gateway node coupled to the second optical network and operable to:

receive the traffic contained in the second copy forwarded from the first gateway node; and

add the traffic contained in the second copy forwarded from the first gateway node to a ring of the second optical network.

2. The system of Claim 1, wherein the regeneration element is further operable to selectively forward the traffic after regenerating and converting the wavelength of the traffic.

3. The system of Claim 1, wherein at least one network comprises a plurality of subnets, each subnet comprising a plurality of add/drop nodes, the number of subnets equal to the number of gateway nodes in the network.

4. The system of Claim 3, wherein, within each subnet, each add/drop node is operable to add and drop traffic independent of the channel spacing of the traffic.

5. The system of Claim 1, wherein each add/drop node comprises one or more optical couplers associated with each ring of the network, the optical couplers operable to passively add and drop traffic to and from the associated ring.

6. The system of Claim 1, wherein the first gateway node comprises:

a first optical coupler operable to receive ingress traffic on the optical ring, to forward the first copy of the received optical signal to the multiplexer/demultiplexer unit, and to forward the second copy of the received optical signal to the regeneration element; and

a second optical coupler operable to receive traffic forwarded by the multiplexer/demultiplexer unit and the regeneration element, and further operable to combine the received traffic such that the combined signal is forwarded on the optical ring.

7. The system of Claim 6, wherein the signal regeneration element comprises:

a splitter operable to make a plurality of copies of the second copy received from the first optical coupler;

one or more filters each operable to receive one of the plurality of copies of the second copy and to forward signals associated with one or more wavelengths of the received copy;

one or more transponders each operable to receive the filtered signal in a particular wavelength from the one or more filters and to regenerate the signal in that wavelength; and

a combiner operable to receive and combine the regenerated signals and to forward the combined signals to the second optical coupler.

8. The system of Claim 7, wherein one or more of the transponders are further operable to convert the wavelength of the received signal.

9. The system of Claim 1, wherein the multiplexer/demultiplexer unit comprises:

a demultiplexer operable to demultiplex the second copy of the received optical signal into a plurality of constituent wavelengths;

a switch operable to selectively forward or terminate each wavelength; and

a multiplexer operable to combine the forwarded wavelengths.

10. The system of Claim 1, wherein each wavelength that is regenerated by the signal regeneration element is terminated by the multiplexer/demultiplexer unit.

11. The system of Claim 1, wherein the first gateway node is further operable to add traffic to the first network that is received from the second gateway node coupled to the second network.

12. The system of Claim 1, wherein the traffic forwarded to the second optical network from the first gateway node is received at an interconnection module operable to couple the first network to the second network, the interconnection module comprising:

an optical coupler coupled to a ring of the first optical network and operable to:

receive the traffic contained in the second copy forwarded to the second optical network from the first optical network;

split the traffic contained in the second copy into substantially identical copies; and

forward a copy of the traffic contained in the second copy to a second optical network; and

a switch coupled to the second optical network and operable to:

receive the copy of the traffic forwarded by the optical coupler; and

selectively forward the copy of the traffic to an optical ring of the second optical network.

13. An optical network system comprising a first optical network and a second optical network, each network comprising at least one optical gateway node and a plurality of passive optical add/drop nodes, the system comprising:

a first add/drop node coupled to the first optical network and operable to:

receive ingress traffic from the first network;

passively forward a first and a second copy of the ingress traffic, the second copy of the ingress traffic forwarded to a distributing/combining element of the add/drop node;

split the second copy of the ingress traffic into multiple substantially identical copies;

filter the second copy of the ingress traffic into one or more constituent wavelengths; and

selectively forward the traffic in the one or more constituent wavelengths of the second copy of the ingress traffic; and

a second add/drop node coupled to the second optical network and operable to:

receive the traffic contained in the second copy forwarded from the first add/drop node; and

add the forwarded traffic contained in the second copy forwarded from the first add/drop nose to an optical ring of the second optical network.

14. The system of Claim 13, wherein at least one network comprises a plurality of subnets, each subnet comprising a plurality of add/drop nodes, the number of subnets equal to the number of gateway nodes in the network.

15. The system of Claim 14, wherein, within each subnet, each add/drop node is further operable to add and drop traffic independent of the channel spacing of the traffic.

16. The system of Claim 13, wherein each add/drop node comprises one or more optical couplers associated with each ring of the network, the optical couplers operable to passively add and drop traffic to and from the associated ring.

17. The system of Claim 13, wherein the first add/drop node is further operable to add traffic to the first network that is received from the second add/drop node coupled to the second network.

18. The system of Claim 13, wherein the traffic forwarded to the second optical network from the first add/drop node is received at an interconnection module operable to couple the first network to the second network, the interconnection module comprising:

an optical coupler coupled to a ring of the first optical network and operable to:

receive the traffic contained in the second copy forwarded to the second optical network from the first optical network;

split the traffic contained in the second copy into substantially identical copies; and

forward a copy of the traffic contained in the second copy to a second optical network; and

a switch coupled to the second optical network and operable to:

receive the copy of the traffic forwarded by the optical coupler; and

selectively forward the copy of the traffic to an optical ring of the second optical network.

19. A method of passively adding traffic from a first optical network to a second optical network, comprising:

receiving ingress traffic from an optical ring of the first optical network at a node coupled to the first optical network;

generating a first and second copy of the ingress traffic;

passively forwarding the first and second copies of the ingress traffic;

splitting the second copy of the ingress traffic into multiple substantially identical copies;

filtering at least one of the copies of the second copy of the ingress traffic into one or more constituent wavelengths;

selectively forwarding the signal in one or more constituent wavelengths of the second copy of the ingress traffic to a node coupled to the second optical network;

receiving the forwarded signal in one or more wavelengths at the node coupled to the second optical network; and

adding the forwarded signal in one or more wavelengths to an optical ring of the second optical network.

20. The method of Claim 19, wherein the node comprises a gateway node.

21. The method of Claim 20, further comprising forwarding the first copy of the ingress traffic to a multiplexer/demultiplexer unit of the gateway node, the multiplexer/demultiplexer unit operable to multiplex the first copy into one or more constituent wavelengths and to selectively forward or terminate the traffic in each wavelength of the first copy.

22. The method of Claim 19, wherein the node comprises an add/drop node.

23. The method of Claim 22, wherein each add/drop node comprises one or more optical couplers associated with each ring of the network, the optical couplers operable to passively add and drop traffic to an from the associated ring.

24. The method of Claim 19, wherein at least one network comprises a plurality of subnets, each subnet comprising a plurality of add/drop nodes and a plurality of gateway nodes, the number of subnets equal to the number of gateway nodes in the network.

25. The method of Claim 24, wherein, within each subnet, each add/drop node is operable to add and drop traffic independent of the channel spacing of the traffic.

26. The method of Claim 19, further comprising adding traffic to the first network at the node coupled to the first network, the traffic received from the node coupled to the second network.

27. The method of Claim 19, wherein the traffic forwarded to the second optical network from the first node is received at an interconnection module operable to couple the first network to the second network, the interconnection module comprising:

an optical coupler coupled to a ring of the first optical network and operable to:

receive the traffic contained in the second copy forwarded to the second optical network from the first optical network;

split the traffic contained in the second copy into substantially identical copies; and

forward a copy of the traffic contained in the second copy to a second optical network; and

a switch coupled to the second optical network and operable to:

receive the copy of the traffic forwarded by the optical coupler; and

selectively forward the copy of the traffic to an optical ring of the second optical network.

28. An optical network, comprising:

at least one optical ring divided into a plurality of subnets;

the subnets each comprising one or more add/drop nodes coupled to the optical ring and operable to passively add and drop traffic to and from the optical ring in one or more wavelengths, at least one of the add/drop nodes further operable to:

receive ingress optical traffic comprising a plurality of optical signals, each signal in a separate channel;

forward a first copy and a second copy of the received optical traffic;

multiplex the signal contained in a first channel of the second copy and the signal contained in a second channel of the second copy into a third channel;

add the multiplexed traffic in the third channel to the traffic in the first and second channels of the first copy;

forward an optical signal containing at least the traffic in the first and second channels of the first copy and the traffic in the third channel to another node in the network; and

a plurality of gateway nodes, each gateway node coupled to the optical ring at a boundary between neighboring subnets, each gateway operable to:

receive the optical signal containing at least the traffic in the first and second channels of the first copy and the traffic in the third channel;

terminate the traffic in the first and second channels of the first copy; and

forward the traffic in the third channel to another node in the network.

29. The network of Claim 28, wherein the gateway node is further operable to:

forward a first copy and a second copy of the optical signal received by the gateway node using a first optical coupler;

selectively forward or terminate the traffic in each wavelength of the first copy of the optical signal received at the gateway node at a multiplexer/demultiplexer unit of the gateway node that is operable to selectively forward or terminate the traffic in each wavelength of the received optical signal, the forwarded traffic not being regenerated; and

selectively perform one of the following on the traffic in each wavelength of the second copy of the optical signal received at the gateway node at a regeneration element of the gateway node: terminate the traffic, including the traffic contained in the first and second channels of the second copy, forward the traffic after regenerating the traffic, or forward the traffic after regenerating and converting the wavelength of the traffic.

30. The optical network of Claim 29, wherein each wavelength that is regenerated by the signal regeneration element is terminated by the multiplexer/demultiplexer unit.

31. The optical network of Claim 29, wherein each gateway node is further operable to:

forward the first copy of the traffic received by the gateway node to the multiplexer/demultiplexer unit; and

forward the second copy of the traffic received by the gateway node to a regeneration element of the gateway node, the second copy bypassing the multiplexer/demultiplexer unit.

32. The optical network of Claim 29, wherein the multiplexer/demultiplexer unit of the gateway node comprises:

a demultiplexer operable to demultiplex the second copy of the traffic received by the gateway node into a plurality of constituent wavelengths;

a switch operable to selectively forward or terminate each wavelength; and

a multiplexer operable to combine the forwarded wavelengths.

33. The optical network of Claim 29, wherein the signal regeneration element comprises:

a splitter operable to make a plurality of copies of the second copy received from the first optical coupler of the gateway node;

one or more filters each operable to receive one of the plurality of copies of the second copy and to forward one or more wavelengths of the associated copy;

one or more transponders operable to receive each filtered wavelength from the one or more filters and to regenerate the signal in that wavelength; and

a combiner operable to receive and combine the regenerated signals and to forward the combined signals to a second optical coupler of the gateway node.

34. The optical network of Claim 33, wherein one or more of the transponders are further operable to convert the wavelength of the signal associated with a filtered wavelength that is received at the transponder.

35. The optical network of Claim 28, wherein at least one add/drop node comprises:

a first optical coupler operable to:

receive the ingress optical traffic on the optical ring;

generate the first copy and the second copy of the received optical traffic;

forward the first copy of the received optical traffic to a second optical coupler; and

forward the second copy of the received optical traffic to a distributing/combining element;

a multiplexer coupled to the distributing/combining element, the multiplexer operable to multiplex traffic contained in the first and second channels of the second copy into the third channel, the multiplexer further coupled to a combining element; and

a second optical coupler operable to receive the traffic forwarded by the first optical coupler and the combining element, and further operable to combine the received traffic such that the combined signal is forwarded on the optical ring.

36. The optical network of Claim 28, wherein, within each subnet, each add/drop node is operable to add and drop traffic independent of the channel spacing of the traffic.

37. The optical network of Claim 28, wherein each add/drop node comprises one or more optical couplers associated with each ring of the network, the optical couplers operable to passively add and drop traffic to and from the associated ring.

38. The optical network of Claim 28, wherein one or more of the gateway nodes are further operable to drop the traffic in one or more wavelengths of the second copy of the optical traffic received by the gateway node to one or more appropriate clients.

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39. The optical network of Claim 28, wherein one or more of the gateway nodes are further operable to add traffic from one or more clients to the optical ring.

40. A method of transmitting multiplexed traffic on an optical ring of an optical network comprising a plurality of add/drop nodes and a plurality of gateway nodes, the method comprising:

receiving ingress optical traffic comprising a plurality of optical signals at a first add/drop node coupled to a first ring of the optical network, each signal in a separate channel;

forwarding the received optical traffic to a second add/drop node on the network;

generating a first copy and a second copy of each of the received optical signals at the second add/drop node;

multiplexing the signals contained in the second copy of each of the received signals into a multiplexed signal;

adding the traffic contained in the multiplexed signal to the traffic contained in the first copy of each of the received signals;

forwarding an optical signal containing at least the traffic contained in the multiplexed signal and the traffic contained in the in the first copies of each of the received signals to a gateway node in the network;

receiving the optical signal containing at least the traffic contained in the multiplexed signal and the traffic contained in the in the first copies of each of the received signals at a first optical coupler of the gateway node, the first optical coupler operable to forward a first copy and a second copy of the optical signal received at the gateway node;

terminating the traffic contained in the first copy of each of the received signals at the gateway node; and

forwarding the traffic in the multiplexed signal to another node in the network from the gateway node.

41. The method of Claim 40, further comprising forwarding a multiplexed signal containing the traffic contained in each of the received signals on a second ring of the optical network.

42. The method of Claim 40, further comprising:

selectively forwarding or terminating the traffic in each wavelength of the first copy of the optical signal received at the gateway node at a multiplexer/demultiplexer unit of the gateway node that is operable to selectively forward or terminate the traffic in each wavelength of the received optical signal, the forwarded traffic not being regenerated; and

selectively performing one of the following on the traffic in each wavelength of the second copy of the optical signal received at the gateway node at a regeneration element of the gateway node: terminate the traffic, including the traffic contained in the first and second channels, forward the traffic after regenerating the traffic, or forward the traffic after regenerating and converting the wavelength of the traffic.

43. The method of Claim 42, wherein each wavelength that is regenerated by the signal regeneration element is terminated by the multiplexer/demultiplexer unit.

44. The method of Claim 42, further comprising:

forwarding the first copy of the optical signal received by the gateway node to the multiplexer/demultiplexer unit; and

forwarding the second copy of the optical signal received by the gateway node to a regeneration element of the gateway node, the second copy bypassing the multiplexer/demultiplexer unit.

45. The method Claim 42, wherein the multiplexer/demultiplexer unit of the gateway node comprises:

a demultiplexer operable to demultiplex the second copy of the optical signal received by the gateway node into a plurality of constituent wavelengths at a demultiplexer of the;

a switch operable to selectively forward or terminate each wavelength; and

a multiplexer operable to combine the forwarded wavelengths.

46. The method of Claim 42, wherein the signal regeneration element comprises:

a splitter operable to make a plurality of copies of the second copy received from the first optical coupler of the gateway node;

one or more filters each operable to receive one of the plurality of copies of the second copy and to forward one or more wavelengths of the associated copy;

one or more transponders operable to receive each filtered wavelength from the one or more filters and to regenerate the signal in that wavelength; and

a combiner operable to receive and combine the regenerated signals and to forward the combined signals to a second optical coupler of the gateway node.

47. The method of Claim 46, wherein one or more of the transponders are further operable to convert the wavelength of the signal associated with a filtered wavelength that is received at the transponder.

48. The optical network of Claim 40, wherein at least one add/drop node comprises:

a first optical coupler operable to:

receive the ingress optical traffic on the optical ring;

generate the first copy and the second copy of the received optical traffic;

forward the first copy of the received optical traffic to a second optical coupler; and

forward the second copy of the received optical traffic to a distributing/combining element;

a multiplexer coupled to the distributing/combining element, the multiplexer operable to multiplex traffic contained in the first and second channels of the second copy into the third channel, the multiplexer further coupled to a combining element; and

a second optical coupler operable to receive the traffic forwarded by the first optical coupler and the combining element, and further operable to combine the received traffic such that the combined signal is forwarded on the optical ring.

49. The method of Claim 40, wherein the optical network comprises at least one optical ring divided into a plurality of subnets and within each subnet each add/drop node is operable to add and drop traffic independent of the channel spacing of the traffic.

50. The method of Claim 40, wherein the optical network comprises a plurality of rings, each add/drop node comprising one or more optical couplers associated with each ring of the network, the optical couplers operable to passively add and drop traffic to and from the associated ring.

51. The method of Claim 40, wherein one or more of the gateway nodes are further operable to drop the traffic in one or more wavelengths of the second copy of the optical signal received by the gateway node to one or more appropriate clients.

52. The method of Claim 40, wherein one or more of the gateway nodes are further operable to add traffic from one or more clients to the optical ring.